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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

GOSHTASBI, JAMSHID

ART UNIT PAPER NUMBER

2637

DATE MAILED: 08/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/430,821

Applicant(s)

QUIGLEY ET AL.

Examiner

Jamshid Goshtasbi-G.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10/29/1999.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-25 is/are rejected.
- 7) ☒ Claim(s) 10 and 13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10/29/1999 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>07/12/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 2-25 are pending in the application. There is no Claim 1.

Claim Objections

2. Claims 10 and 13 are objected to because of the following informalities: As to **Claim 10**, the limitation starting on line 5 ends with a (.) instead of a (;). As to **Claim 13**, the word "and" at the end of the limitation starting on line 9 is not needed. Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

4. Claim 25 is rejected under 35 U.S.C. 102(e) as being anticipated by US Patent No. 6353604 B2 to Grimwood et al.

As to **Claim 25**, Grimwood et al. discloses a remote (cable) modem in a digital communication system, comprising a transmitter for sending (transmitting) ranging (and training bursts) signals to a (headend modem controller of a central unit) CMTS to enable CMTS (headend modem) to generate equalization coefficients and to return such equalization coefficients (to the remote modem) (col. 56, lines 35-53; col. 58, line

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64 to col. 59, line 8; col. 68, lines 18-37), a receiver (a computer to monitor downstream messages received by said receiver from said headend modem) to process the equalization coefficients returned (received from) by the CMTS (headend modem) (col. 56, lines 35-53; col. 68, lines 18-37), a source of data (upstream data burst) to be sent (transmitted) to the CMTS (headend modem) (col. 56, line 59; col. 68, lines 18-37), and an equalizer (pre-emphasis filter) that uses (by convolving) the equalization coefficients received (from headend modem) to pre-equalize the data sent to the CMTS (headend modem) (col. 60, lines 46-53; col. 68, lines 18-37); further, Grimwood et al. shows systems and processes for transmitting digital signals bidirectionally over shared media such as cable TV plants, where a central unit (CU) and its headend controller perform the functions of a cable modem termination system that can receive signal bursts transmitted on an upstream channel (col. 34, lines 11-14) from a remote (cable modem) unit (RU); further, the CU comprises a demodulator for receiving signal bursts on the upstream channel (col. 50, lines 37-42), a computer programmed to generate media access controller (MAC) messages for downstream transmission; further, the RU comprises a programmed computer for receiving the downstream messages in MAC processes and generates offset control signals and upstream management and control messages to implement the ranging and training transmissions; (Figure 23; col. 47, line 56 to col. 48, line 2); further, disclosed is the use of decision feedback equalizer (DFE) adaptive filters in the demodulator of the RU with algorithms to settle on tap weight coefficients which equalize the upstream channel (col. 50, lines 8-21; Fig. 24; col. 53, line 56 to col. 54, line 53) and feedforward equalizers (FFE) with adaptive tap

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coefficients with algorithms to settle on tap weight coefficients for equalization; further, developed equalization coefficients are transmitted to the transmitter (the RU) in downstream messages for to use for upstream equalization (col. 56, lines 46-53) for transmitting bursts of symbols upstream; (See Fig. 24 and the corresponding discussions: col. 47 to col. 54; col. 50, lines 1-22; col. 53, line 56 to col. 54, line 53).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gorman et al. (US 6137793) in view of Krasner et al. (US 6298098).

As to **Claim 2**, Gorman et al. discloses (figures 1-3) a two-way hybrid fiber-coax cable networks where the cable modem termination system (CMTS) of its head-end can receive signal bursts transmitted on an upstream channel of a cable modem system, and where the CMTS comprises a demodulator for receiving signal bursts (burst receiver 504 of upstream receiver, Figure 5 and col. 15, lines 49-64) on the upstream channel; a media access controller (MAC) that generates for downstream transmission [MAP] messages that assign time slots (figures 10 and 12) in which cable modems may transmit signal bursts on the upstream channel (col. 7, lines 54-56; col. 11, lines 32-59;

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col15, lines 58-64; and col. 21, lines 19 -66); a transmitter that transmits the [MAP] messages downstream to the cable modems (col. 14, lines 20-22; col. 15, lines 58-64; col. 16, lines 10-24); and a device (FEC Processor 505,) connected to the demodulator for sensing cable conditions (RPM 603, monitoring some status activity, col. 17, lines 39-51) on the upstream channel; Gorman et al., however, fails to teach the inclusion of idle slots in the MAC generated messages; neither does Gorman et al. teaches the sensing of the cable conditions during the "idle slots;" however, Krasner et al. describes cable data transmission system which utilizes time division multiplexing in a downstream direction from a headend unit to multiple subscribers and a time division multiple access transmission from subscribers to the headend unit, where in the upstream, subscribers send data to the headend in a burst fashion in assigned time slots (col. 1, lines 28-41); further, Krasner et al. teaches a design of TDMA data bursts to contain empty bursts during which no subscriber (CM) transmits; and where during this dead time (idle slot), the burst demodulator measures the background noise power and resets its acquisition threshold based on the average noise measured (col. 2, lines 1-6; col. 5, lines 13-20); further, Krasner et al., also, teaches computing the noise level during an empty [idle] slot (col. 4, lines 35-37; Claim 1, col. 5, lines 54-55). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Krasner et al. into the method of Gorman et al. for producing the claimed invention because including the idle (empty) slots that are assigned to no cable modem transmission in the [MAP] messages provides for the

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measurement of the background noise [sensing cable conditions] on the upstream channel during time slots [idle slots] that are known to the headend CMTS.

7. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gorman et al. (US 6137793) in view of Krasner et al. (US 6298098) as applied to claim 2 above, and further in view of Franks (IEEE TCT, 8/1970).

Claim 3 inherits the limitations of Claim 2; further, Krasner et al. discloses the use of notch filter in the burst receiver/demodulator of the headend (col. 4, lines 15-23); further, Franks teaches it is frequently necessary to insert a narrow-band rejection filter (notch filter) in the transmission path so as to suppress single-frequency interference or to provide a frequency slot for the transmission of sinusoidal synchronizing signals (Page 447, col. 1, Introduction). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Franks and Krasner et al. into the method of Gorman et al. for producing the claimed invention because a notch filter can detect notch noises on the upstream channel.

8. Claims 4-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gorman et al. (US 6137793) in view of Krasner et al. (US 6298098) as applied to claim 2 above, and further in view of Franks (IEEE TCT, 8/1970) and Grimwood et al. (US 6353604 B2).

Claim 4 inherits the limitations of Claim 3; further, Franks teaches that the insertion of a notch filter in the transmission path causes distortion and that delay equalization of the notch characteristics can be quite effective in reducing the amount of

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the intersymbol interference while maintaining the desired rejection capability (Page 449, col. 1, Conclusions); further, Grimwood et al. teaches the use of decision feedback equalizer adaptive filters in the demodulator of the headend controller (CMTS) with algorithms to settle on tap weight coefficients which equalize the upstream channel (col. 50, lines 8-21; Fig. 24; col. 53, line 56 to col. 54, line 53). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Franks and Grimwood et al. into the method of Gorman et al. for producing the claimed invention because coefficients of (the feedback filter of) a DEF adaptive filter could be adjusted to compensate for distortion caused by the notch filter.

Claim 5 inherits the limitations of Claim 4; further, Grimwood et al. teaches the use of feedforward equalizers (FFE) with adaptive tap coefficients in the demodulator of the headend controller (CMTS) with algorithms to settle on tap weight coefficients for equalization, where the FFE (and the FBE) and the DFE receive their adaptive tap coefficients from a LMS calculation circuit (col. 54, lines 1-3); further, the developed equalization coefficients are transmitted to the transmitter (of the RU) in downstream messages for to use for upstream equalization (col. 56, lines 46-53) for transmitting bursts of symbols upstream; (See Fig. 24 and the corresponding discussions: col. 47 to col. 54; col. 50, lines 1-22; col. 53, line 56 to col. 54, line 53). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Grimwood et al. into the method of Gorman et al. for

producing the claimed invention because having a feedforward filter in the DFE could be used for establishing (developing) pre-equalization coefficients (to be used by the CM).

Claim 6 inherits the limitations of Claim 5; further, Kranser et al. shows (Fig. 4A) an A/D converter (in the receiver/demodulator) connected to the notch filter; further Grimwood et al. shows (Fig. 24) a demodulator & A/D converter that is connected to the DFE; further, the MAC message generator (Computer 405) receives the binary data from the demodulator and A/D converter (col. 47, lines 56-65). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Kranser et al. and Grimwood et al. into the method of Gorman et al. for producing the claimed invention because the notch filter and the DFE must process the received upstream burst and develop pre-equalization coefficients for MAC to generate MAC messages for downstream transmission.

Claim 7 inherits the limitations of Claim 6; further, Grimwood et al. teaches the use of a computer 405 in the CU receiver that is programmed to execute MAC processes to generate the downstream messages (col. 47, lines 56-65); further, the DFE communicate with the computer 405 to establish the pre-equalization coefficients to be included in downstream messages. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Grimwood et al. into the method of Gorman et al. for producing the claimed invention because both the binary data and the pre-equalization coefficients are needed by MAC processor.

Claim 8 inherits the limitations of Claim 7; further, Grimwood et al. discloses that in response to an upstream equalization by an RU over a predetermined number of minislots, the CU lets the DFE and FEE and the LMS settle on tap weight (pre-equalization) coefficients that are then sent (transmitted) downstream to RU; further, this downstream transmission to send the offset, power alignment and equalization coefficients is symbolized by downstream messages (col. 50, lines 6-18; col. 54, lines 4-11). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Grimwood et al. into the method of Gorman et al. for producing the claimed invention because an upstream transmitter is needed for transmitting the pre-equalization coefficients established by the Feed forward filter of the DFE/FEE.

Claim 9 inherits the limitations of Claim 8; further, Grimwood et al., as treated in the rejection of Claim 8 above, discloses a MAC (computer 405) that transmits downstream messages (including the pre-equalization coefficients). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Grimwood et al. into the method of Gorman et al. for producing the claimed invention because the MAC needs the transmitter to transmit the pre-equalization coefficients.

As to **Claim 10**, the claimed CMTS recites features that correspond with subject matter mentioned above in the rejection of claims 2-6 and are applicable hereto.

Claim 11 inherits the limitations of Claim 10; further, the claimed device includes features that correspond with subject matter treated above in the rejection of Claim 7 and are applicable hereto.

Claim 12 inherits the limitations of Claim 10; further, the claimed device includes features that correspond with subject matter treated above in the rejection of claims 8 and 9 and are applicable hereto.

As to **Claim 13**, the claimed method recites features that correspond with subject matter mentioned above in the rejection of claims 2 and 3 and are applicable hereto.

Claim 14 inherits the limitations of Claim 13; further, the claimed method includes features that correspond with subject matter treated above in the rejection of claims 2 and 3 and are applicable hereto.

Claim 15 inherits the limitations of Claim 14; further, the claimed method includes features that correspond with subject matter treated above in the rejection of Claim 3 and are applicable hereto.

Claim 16 inherits the limitations of Claim 15; further, the claimed method includes features that correspond with subject matter treated above in the rejection of Claim 4 and are applicable hereto.

Claim 17 inherits the limitations of Claim 16; further, Grimwood et al. disclose a ranging and training process that starts with the receiving of a ranging signal from an RU (a cable modem) on the upstream channel, followed by adjusting coefficients of a DFE/FFE filters responsive to the received signal to eliminate or reduce (compensate) and correct for ISI interference on the upstream channel (figures 23 and 24; col. 50,

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lines6-18; col. 54, lines 4-55); further, the claimed method includes features that correspond with subject matter treated above in the rejection of claims 5 and 9 and are applicable hereto.

Claim 18 inherits the limitations of Claim 17; further, the claimed method includes features that correspond with subject matter treated above in the rejection of Claim 9 and are applicable hereto.

As to **Claim 19**, the claimed method recites features that correspond with subject matter treated above in the rejection of claims 2, 3, 9, 14, 15, and 17 and are applicable hereto.

Claim 20 inherits the limitations of Claim 19; further, the claimed method includes features that correspond with subject matter treated above in the rejection of claims 5, 16, and 17 and are applicable hereto.

Claim 21 inherits the limitations of Claim 20; further, the claimed method includes features that correspond with subject matter treated above in the rejection of claims 3, 4, and 16 and are applicable hereto.

Claim 22 inherits the limitations of Claim 21; further, the claimed method includes features that correspond with subject matter treated above in the rejection of claims 4 and 16 and are applicable hereto.

Claim 23 inherits the limitations of Claim 22; further, the claimed method includes features that correspond with subject matter treated above in the rejection of claims 2 and 13 and are applicable hereto.

Claim 24 inherits the limitations of Claim 23; further, the claimed method includes features that correspond with subject matter treated above in the rejection of claims 9 and 18 and are applicable hereto.

Conclusions

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. [Xu et al.] teaches the inclusion of SYNC /TRAINING signal and EMPTY time slots in the MAC message. [Shalvi et al.] teaches pre-equalization and IRS minimization. [Segal et al.] teaches DFE. [Gosh et al.] teaches the treatment of an ingress noise in with an ingress rejection filter having programmable but fixed coefficients.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jamshid Goshtasbi-G., whose telephone number is (703) 305-8976. The examiner can normally be reached on M-F 8:00/4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on (703) 308-7728. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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Jamshid Goshtasbi-G.
Examiner
Art Unit 2637


KHAI TRAN
PRIMARY EXAMINER 6/3/04